

**What is claimed is:**

1       1. A liquid crystal display with an integrated  
2       color filter, comprising:

3               an active matrix substrate with a plurality of  
4               switching elements;

5               an insulating layer formed on the active matrix  
6               substrate;

7               a double-organic layer formed on the insulating  
8               layer;

9               a plurality of pixel electrodes formed on the  
10          double-organic layer, and electrically  
11          connected to the respective switching  
12          elements via a plurality of respective  
13          contact holes;

14          a substrate positioned a predetermined distance  
15          above the active matrix substrate; and

16          a liquid crystal layer between the two  
17          substrates.

1       2. The liquid crystal display with an integrated  
2       color filter as claimed in claim 1, wherein the double-  
3       organic layer comprises a plurality of color-filter units  
4       and a transparent organic layer.

1       3. The liquid crystal display with an integrated  
2       color filter as claimed in claim 2, wherein the color-  
3       filter units layer is formed above the transparent  
4       organic layer.

1           4. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the  
3 transparent organic layer is formed above the color-  
4 filter units layer.

1           5. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the  
3 transparent organic layer is formed of polycarbonate or  
4 acrylic-resin.

1           6. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the light  
3 transmission of the transparent organic layer is above  
4 90%.

1           7. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the  
3 dielectric constant of the transparent organic layer is  
4 2.6-3.6.

1           8. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the thickness  
3 of the transparent organic layer is 1.5-3.5 $\mu$ m.

1           9. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the  
3 dielectric constant of the color-filter units is 3.5-5.0.

1           10. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the thickness  
3 of the color-filter units is 1.0-2.0 $\mu$ m.

1           11. The liquid crystal display with an integrated  
2         color filter as claimed in claim 2, wherein the color-  
3         filter units includes red, green and blue units.

1           12. The liquid crystal display with an integrated  
2         color filter as claimed in claim 1, wherein the pixel  
3         electrodes are made of indium tin oxide.

1           13. The liquid crystal display with an integrated  
2         color filter as claimed in claim 1, wherein the contact  
3         holes pass through the insulating layer and the double-  
4         organic layer.

1           14. An integrated color filter, comprising:  
2                 a substrate;  
3                 a plurality of switching elements formed on the  
4                         substrate in a matrix arrangement;  
5                 an insulating layer formed on the switching  
6                         elements;  
7                 a transparent organic layer formed above the  
8                         insulating layer;  
9                 a plurality of color-filter units formed above  
10                         the transparent organic layer; and  
11                 a plurality of pixel electrodes formed above  
12                         the color-filter units, and electrically  
13                         connected to the respective switching  
14                         elements via a plurality of respective  
15                         contact holes, wherein the contact holes  
16                         pass through the transparent organic  
17                         layer, color-filter units and the  
18                         insulating layer.

1           15. An integrated color filter, comprising:  
2                 a substrate;  
3                 a plurality of switching elements formed on the  
4                         substrate in a matrix arrangement;  
5                 an insulating layer formed on the switching  
6                         elements;  
7                 a plurality of color-filter units formed above  
8                         the insulating layer;  
9                 a transparent organic layer formed above the  
10                         color-filter units; and  
11                 a plurality of pixel electrodes formed above  
12                         the color-filter units, and electrically  
13                         connected to the respective switching  
14                         elements via a plurality of respective  
15                         contact holes, wherein the contact holes  
16                         pass through the transparent organic  
17                         layer, color-filter units and the  
18                         insulating layer.

1           16. A method of fabricating an integrated color  
2                 filter, comprising:  
3                 providing a substrate;  
4                 forming a plurality of switching elements on  
5                         the substrate in a matrix arrangement;  
6                 forming an insulating layer on the switching  
7                         elements;  
8                 forming a transparent organic layer on the  
9                         switching elements, wherein the  
10                         transparent organic layer has a first hole

11                         exposing a part of the surface of the  
12                         insulating layer;  
13                         etching the insulating layer by using the  
14                         transparent organic layer as an etching  
15                         mask to form a second hole in the  
16                         insulating layer, wherein the second hole  
17                         joins the first hole and exposes a part of  
18                         the surface of the switching elements;  
19                         forming a plurality of color-filter units with  
20                         a third hole on the transparent organic  
21                         layer, wherein the third hole forms a  
22                         contact hole together with the first and  
23                         the second holes to expose the part of the  
24                         surface of the switching elements; and  
25                         forming a plurality of pixel electrodes on the  
26                         color-filter units, wherein the pixel  
27                         electrodes are electrically connected with  
28                         the switching elements via the contact  
29                         hole.

1                         17. The method of fabricating an integrated color  
2                         filter as claimed in claim 16, wherein the transparent  
3                         organic layer is made of polycarbonate or acrylic-resin.

1                         18. The method of fabricating an integrated color  
2                         filter as claimed in claim 16, wherein the light  
3                         transmission of the transparent organic layer is above  
4                         90%.

1           19. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the dielectric  
3         constant of the transparent organic layer is 2.6-3.6.

1           20. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the thickness of  
3         the transparent organic layer is 1.5-3.5 $\mu$ m.

1           21. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the dielectric  
3         constant of the color-filter units is 3.5-5.0.

1           22. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the thickness of  
3         the color-filter units is 1.0-2.0 $\mu$ m.

1           23. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the color-filter  
3         units includes red, green and blue units.

1           24. The method of fabricating an integrated color  
2         filter as claimed in claim 16, wherein the pixel  
3         electrodes are made of indium tin oxide.

1           25. A method of fabricating an integrated color  
2         filter, comprising:

3                 providing a substrate;

4                 forming a plurality of switching elements on  
5                         the substrate in a matrix arrangement;

6                 forming an insulating layer on the switching  
7                         elements;

8                 forming a plurality of color-filter units with  
9                         a first hole on the insulating layer;  
10                 forming a transparent organic layer on the  
11                         color-filter units, having a second hole  
12                         to expose the first hole;  
13                 etching the insulating layer by using the  
14                         transparent organic layer as a mask,  
15                         forming a third hole in the insulating  
16                         layer to expose a part of the surface of  
17                         the switching elements, wherein the third  
18                         hole forms a contact hole together with  
19                         the first and the second holes; and  
20                 forming a plurality of pixel electrodes on the  
21                         transparent organic layer, wherein the  
22                         pixel electrodes are electrically  
23                         connected with the switching elements via  
24                         the contact hole.

1                 26. The method of fabricating an integrated color  
2                         filter as claimed in claim 25, wherein the transparent  
3                         organic layer is made of polycarbonate or acrylic-resin.

1                 27. The method of fabricating an integrated color  
2                         filter as claimed in claim 25, wherein the light  
3                         transmission of the transparent organic layer is above  
4                         90%.

1                 28. The method of fabricating an integrated color  
2                         filter as claimed in claim 25, wherein the dielectric  
3                         constant of the transparent organic layer is 2.6-3.6.

1           29. The method of fabricating an integrated color  
2         filter as claimed in claim 25, wherein the thickness of  
3         the transparent organic layer is 1.5-3.5 $\mu$ m.

1           30. The method of fabricating an integrated color  
2         filter as claimed in claim 25, wherein the dielectric  
3         constant of the color-filter units is 3.5-5.0.

1           31. The method of fabricating an integrated color  
2         filter as claimed in claim 25, wherein the thickness of  
3         the color-filter units is 1.0-2.0 $\mu$ m.

1           32. The method of fabricating an integrated color  
2         filter as claimed in claim 25, wherein the color-filter  
3         units includes red, green and blue units.

1           33. The method of fabricating an integrated color  
2         filter as claimed in claim 25, wherein the pixel  
3         electrodes are made of indium tin oxide.